Patent Claims

1. A nucleic acid molecule which is selected from the group consisting of

a) nucleic acid molecules which encode a polypeptide which contains the amino acid sequence disclosed by SEQ ID NO: 2;

b) nucleic acid molecules which contain the sequence depicted by SEQ ID NO: 1;

c) nucleic acid molecules whose complementary strand hybridizes with a nucleic acid molecule from a) or b) under stringent conditions and which encode a polypeptide which exhibits the biological function of a photoprotein;

d) nucleic acid molecules which differ from the nucleic acid molecules mentioned under c) due to the degeneracy of the genetic code;

e) nucleic acid molecules which exhibit a sequence homology with SEQ ID NO: 1 of at least 95% and encode a polypeptide which has the biological function of a photoprotein; and

f) nucleic acid molecules which exhibit a sequence homology with SEQ ID NO: 1 of at least 65% and encode a polypeptide which has the biological function of a photoprotein.

2. A nucleic acid molecule which is selected from the group consisting of

a) nucleic acid molecules which encode a polypeptide which contains the amino acid sequence disclosed by SEQ ID NO: 3;

b) nucleic acid molecules which contain the sequence depicted by SEQ ID NO: 4;

c) nucleic acid molecules whose complementary strand hybridizes with a nucleic acid molecule from a) or b) under stringent conditions and which encode a peptide which exhibits the biological function of a signal or leader peptide;

d) nucleic acid molecules which differ from the nucleic acid molecules mentioned under c) due to the degeneracy of the genetic code;

e) nucleic acid molecules which exhibit a sequence homology with SEQ ID NO: 4 of at least 90% and encode a peptide which has the biological function of a signal or leader peptide; and

f) nucleic acid molecules which exhibit a sequence homology with SEQ ID NO: 4 of at least 60% and encode a peptide which has the biological function of a signal or leader peptide.

3. A nucleic acid molecule which is selected from the group consisting of

a) nucleic acid molecules which encode a polypeptide which contains the amino acid sequence disclosed by SEQ ID NO: 6;

b) nucleic acid molecules which contain the sequence depicted by SEQ ID NO: 5;

c) nucleic acid molecules whose complementary strand hybridizes with a nucleic acid molecule from a) or b) under stringent conditions and which encode a polypeptide which exhibits the biological function of a photoprotein;

d) nucleic acid molecules which differ from the nucleic acid molecules mentioned under c) due to the degeneracy of the genetic code;

e) nucleic acid molecules which exhibit a sequence homology with SEQ ID NO: 5 of at least 95% and encode a polypeptide which has the biological function of a photoprotein; and

f) nucleic acid molecules which exhibit a sequence homology with SEQ ID NO: 5 of at least 80% and encode a polypeptide which has the biological function of a photoprotein.

4. A nucleic acid as claimed in claim 1, 2 or 3 which contains a functional promoter 5' to the coding sequence.

5. A recombinant DNA or RNA vector which contains a nucleic acid as claimed in claim 4.

6. An organism which harbors a vector as claimed in claim 5.

7. An oligonucleotide having more than 10 consecutive nucleotides which is identical or complementary to a constituent sequence of a nucleic acid molecule as claimed in claim 1, 2 or 3.

8. A polypeptide which is encoded by a nucleic acid sequence as claimed in claim 1, 2 or 3.

9. A method for expressing the polypeptide as claimed in claim 8 in bacteria, viral systems, yeasts or eukaryotic cells or in *in-vitro* expression systems.

10. A method for purifying/isolating a photoprotein polypeptide as claimed in claim 8.

11. A peptide having more than 5 consecutive amino acids which is recognized immunologically by antibodies directed against the photoprotein mtClytin.

12. A peptide having more than 5 consecutive amino acids which is recognized immunologically by antibodies directed against the photoprotein clytin-2.

13. A peptide having more than 5 consecutive amino acids which is recognized immunologically by antibodies directed against the signal or leader peptide disclosed by SEQ ID NO: 3.

14. The use of a nucleic acid as claimed in claims 1 to 5 as a marker gene or reporter gene.

15. The use of a photoprotein as claimed in claim 8 as a label or reporter.

16. The use of a nucleic acid which contains the sequence depicted as SEQ ID NO: 4 as a signal or leader sequence.

17. The use of a peptide which contains the sequence depicted as SEQ ID NO: 3 as a signal or leader peptide.

18. The use as claimed in claim 16 or 17 for transporting a protein which is fused to the signal or leader peptide into cell organelles.

19. The use as claimed in claim 18, wherein the cell organelles are mitochondria or the endoplasmic reticulum (ER).

20. The use of the polypeptides as claimed in claim 8 as reporter proteins in searching for pharmacological active compounds.

21. The use of the nucleic acids as claimed in claims 1-3 as reporter genes in searching for pharmacological active compounds.